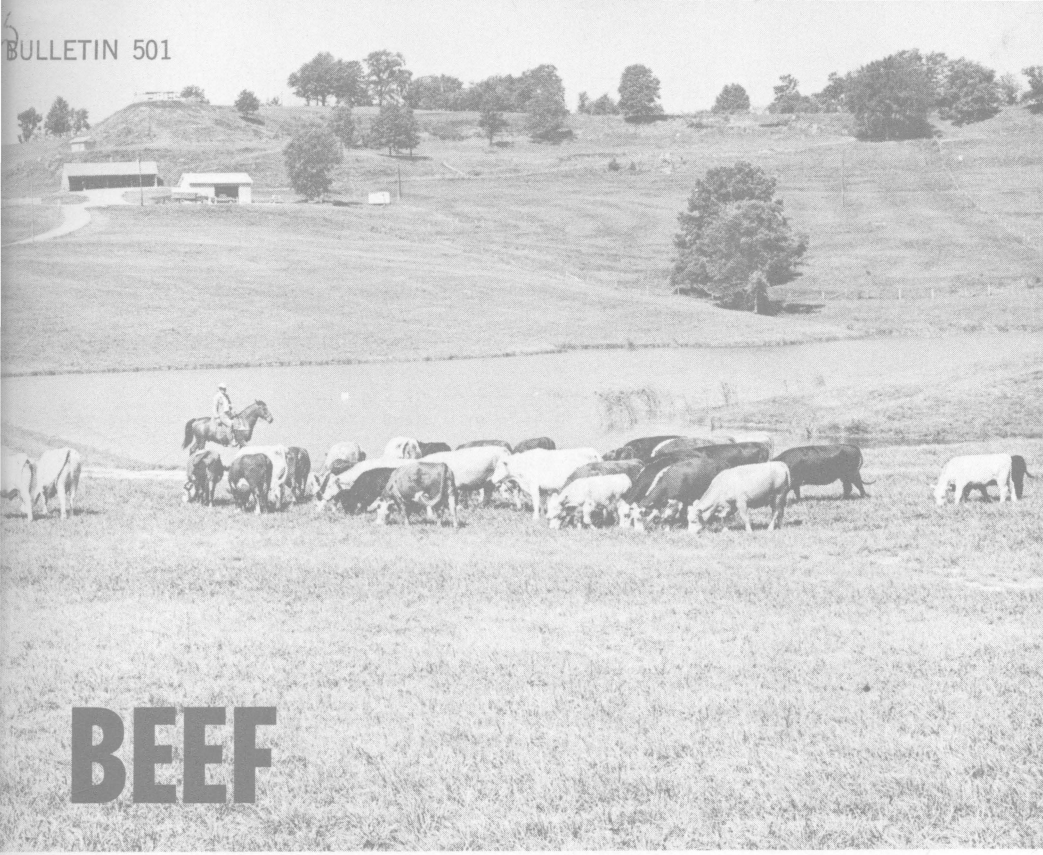
BULLETIN 501



BEEF

Cow and Calf Production In Ohio

COOPERATIVE EXTENSION SERVICE
THE OHIO STATE UNIVERSITY

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BEEF

Cow and Calf Production In Ohio

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About one-fourth of the farm land in Ohio is in pasture or woodland pasture. Many more acres now in crop land would produce more total digestible nutrients per acre as properly managed grass land. Beef cattle are excellent market vehicles for grass, and they fit well in practically all Ohio farming operations. They can be a major source of income or a supplemental enterprise for you, depending on your conditions. Among the numerous opportunities in cattle production are feedlot finishing, feeder cattle and butcher calf production, cow herds, and registered cattle.

Information presented here is primarily for producers with commercial cow herds producing feeder calves.

TRENDS

The Midwest plains states are considered the cow-calf area of the United States. These western ranges have been stocked at or near capacity. However, the use of irrigation may gradually shift much of this land from grass production to row crops. This could swing a much larger percentage of the beef cows, which are continuing to increase in the United States, to the Cornbelt and the southeastern states.

In Ohio, beef cow numbers are increasing in the hill counties of the state. At the same time, many of the more productive counties have actually shown decreases in numbers. This shift is the result of several conditions developing in the state: (1) much of the hill land is best suited for the production of grasses and forage, (2) strip mined land is more easily reclaimed as pasture than as crop land, and (3) land values are much lower in southern and eastern Ohio. As a result, investment costs per cow are as low as those for any area in the United States.

Another reason is that a large percentage of the farmers in the southern and southeastern areas work part time off the farm, and many farm operations are part time setups. Because of the low labor requirements, beef cow and calf enterprises fit adequately into such farming operations and are becoming a major source of income in these areas.

Adjustments to these shifting trends in cow and calf operations will tend to develop in the areas of rougher terrain which are best suited for pasture and forage production. These areas extend into most districts of Ohio. But, of the total acres involved, the highest percentage of permanent pasture land exists in the southern and eastern Ohio areas.

The type of farm and farming operation you have should determine whether or not your farm will maintain a commercial beef cow herd. Tillable land that will produce 100 bushels of corn per acre is suitable for commercial cattle feeding. On the other hand, if the topography is more adapted to pasture and forage production, a beef cow herd may be the answer. Do not let the price level of beef cattle influence your decision. Rather let the amount and quality of forage your farm will produce be your guide.

TYPES OF OPERATIONS

Cow and calf operations are most pop ular where capital is limited, labor is scarce, unlevel land prevents high yields of corn, and grass and forage are abundant The beef cow herd is the least speculative operation Weaned calves and additional income from cull cows and bulls sold after use in the herd are principal products Calves can be produced and sold as (1) feeder calves at weaning, (2) fat baby beeves, (3) finished cattle after a period in the feedlot, (4) yearling feeder cattle the following year after being roughed through the winter, or (5) replacement cattle.

There is a definite need for producers to grow feeder cattle from 400 to 450 pounds up to 600 to 700 pounds to supply demands of the commercial feedlot operators who prefer starting with heavier cattle Feeder and replacement cattle can be grown on farms with good quality pasture—high quality forage which is needed for growing out calves to heavier weights before going into feedlots These farms may be more level, grain production may be limited, and hay and sod crops may be needed for conservation purposes

Producing fat baby beeves has been popular in Ohio, especially in herds where the cows resulted from using beef bulls on dairy cows These crossbreds give more milk and, with a good creep feeding program, calves of these animals reach light slaughter weights at about eight months of age when they are weaned Plenty of good pasture and a limited amount of grain are necessary for this type of enterprise

Another alternative is grain finishing the calves in the feedlot after weaning This operation is best adapted to the farm that has some pasture land in addition to grain, silage, and hay Finishing cattle for slaughter furnishes a market for grain and the number of cows maintained probably will be less because grain is necessary for this enterprise

Purebred breeding is highly specialized You must be willing to learn and practice breeding methods Your ability to judge animals, master records and pedigree information, and sell cattle to best advantage,all are important to success Easy access to your farm helps improve sales, too

Performance testing is becoming more important in the purebred operation. Mediocre purebred herds will make more money when operated commercially.

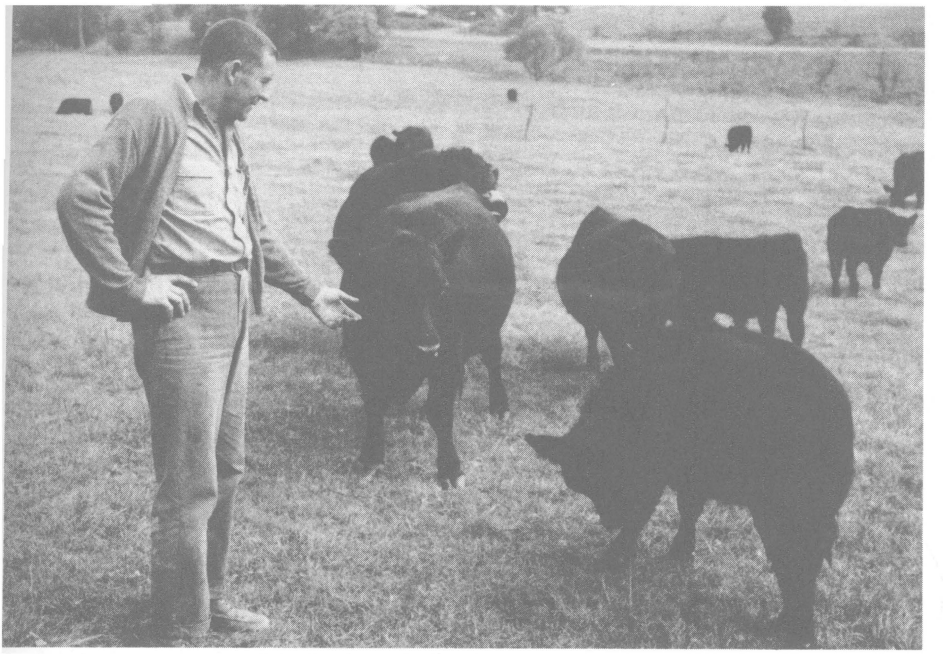
COMMERCIAL COW HERD

Buyers prefer calves uniform in conformation and color. Either Angus, Hereford, or Shorthorn grade cow herds are acceptable The supply of females of these breeds is available and at prices that the commercial operator can afford to pay. All three breeds do well under Ohio conditions Keep the following things in mind when you select your breed (1) Which breed is popular in your area? (2) Which breed can you sell best? (3) Which breed do you naturally prefer?

Cattle within a breed may vary more in performance than those between breeds There are good and plain cattle in all breeds The producer must decide which is the best breed for his operation. Regardless of breed, selection should be based on weight for age, efficiency of gain, uniformity of conformation, quality of hair and freedom from defects and disease The efficiency of the industry is more closely related to how fast and economically an animal gains from 500 to 1,000 pounds or market weight than whether or not the individual weighs a ton at maturity

Age and Quality to Choose

Starting with heifer calves requires the least outlay of cash however, you will have to wait almost two years for payday. Greater selection is possible with calves. Start with about twice as many calves as you intend to end up with in the breeding herd. Culled heifers can be fed out or sold as feeders as they are removed from the herd. If you start with heifer calves,



Select uniform calves in breed you prefer.

be sure to vaccinate them for brucellosis.

Bred heifers are usually available in late summer or fall. They cost more than calves but will give you a quicker return. Avoid buying the other person's culls. Look for good beef breeding and size for age. Know the kind of bull to which the heifers are bred. Buy subject to a pregnancy test because a few heifers may be open.

When starting with cows, select properly marked animals with indications of good beef breeding and ample bone. Each breed has a color pattern or markings characteristic of the breed. Find out the age and origin of cows when buying—and again, *watch out for culls*. Know the kind of bull to which the cows were bred and find out the breeding dates. Well-bred, young cows might be the cheapest buy in the long run because they will probably produce more pounds of calf by the end of the first year.

It is advisable to start out with straight bred females even though you plan to crossbreed. Latest research indicates that the greatest advantage is obtained in the first generation of crossbreeding. At present, it may not be desirable to go beyond the first generation crossbred females. Cattle feeders are still willing to pay more for uniformity when buying feeders.

Culls and Replacements

Cull the cow herd on the basis of regularity of calving and weight and quality of calves produced. If a cow's first calf is poor, her later calves are also likely to be below average. You can safely cull cows in the lower 10 to 25 per cent of a herd on the basis of performance records of one or two of their calves.

The beef cow is in the prime of her productive life between six and ten years of age. The longer a cow keeps producing and stays in the herd the lower the replacement cost.

There is no place in a commercial cow herd for slow or non-breeders, regardless of individuals. Turn the bull in with the cow herd each year for a limited period (90-100 days) and then remove him. This practice helps prevent premature breeding of heifer calves. Remove all open cows

from the breeding herd in the fall at weaning time.

Selecting replacements from within the herd is most desirable because more information is available on their performance. For replacements in an established herd, 20 to 40 per cent of the heifers raised must be saved if herd numbers are to be maintained. The actual percentage will depend on the per cent calf crop, culling intensity among cows, and the age at which cows are replaced. Select heifers with heavy weaning weights, good rate of gain, and acceptable beef-type conformation.

Performance records help you cull older animals and select replacement animals more intelligently. These records need not be elaborate but should include the following:

1. Identification of each animal by means of ear tattoos, ear tags, ear notches, brands or neck straps.
2. Parentage of each calf.
3. Date of birth and sex of each calf.
4. A weight and grade taken at weaning to evaluate the dam's maternal ability.

Care of the Cow Herd

If the beef cow herd is to be profitable, maximum use of pasture and cheap roughage must be obtained. Pastures are the natural feed for beef cows, and ordinarily cows on good pasture will not need supplemental feed except for free choice salt and mineral.

If pastures are short because of drought or overgrazing, supplement with hay, silage, green chop, or other roughage. Some hay or other dry roughage may be beneficial in early spring when pasture is extremely succulent.

If calves are weaned in the fall (October), the beef cow herd may be maintained well into the winter on meadow, small grain aftermath, stalk fields after corn has been harvested, or permanent pasture where grass has been stockpiled during the late summer growing months. The herd can get most of its roughage from such material—feed that might other wise be wasted. Furthermore, the beef cow can do her own harvesting much cheaper than the roughage can be harvested mechanically.

Start winter feeding when pasture conditions demand feeding and before the cows start loosing weight. Supply feed in small amounts at first feeding and increase as necessary to prevent waste. As a general rule, feed the poorest quality roughage first while the cow still has her stored reserves and save the best quality for late winter and the calving season. In many areas of Ohio the cow herd can be fed on permanent pasture sod which is well drained. This practice saves cleaning and manure hauling during the busy spring season.

Feed cows, yearlings, and calves separately during the winter feeding months because the requirements of each age group are different. Timid, thin cows may be added to the yearlings for wintering.

Rations for dry beef cows can vary widely, because they should depend on the supply of feed available. To maintain weight, a beef cow needs about two pounds of dry matter daily per 100 pounds of liveweight. Much of this can be straw, low quality grass hay, corn stalks, ground corn cobs, or similar material. Protein will need to be fed when the ration is made up completely of these feedstuffs. Feed good-quality hay or silage in limited amounts or a cow will eat more than she needs and will increase the feed costs. A fat cow may have trouble both at breeding time and calving time.

Cows calving in the fall require higher levels of nutrition in order to stimulate milk production and maintain quick conception. Fall calving cows are dry during lush pasture season and can be expected to gain more weight during their dry periods and can lose some weight while raising the calves. Protein supplement should be supplied to the rations of these cows as roughage dries up, usually around Thanksgiving.

Heifer calves intended for the breeding herd should be wintered on a growing ration—not a fattening one. In the long run it is cheaper to grow them well than

Wintering the cow herd.

to delay their development and calve them at three years of age. Replacement heifers should be maintained in order to weigh 700 pounds or more at 16 months of age.

Use either corn or grass silage and good quality mixed hay as the basic ration and feed the calves all that they will eat. Add one-half pound of protein supplement for each heifer with corn silage. If hay is poor quality, add one pound of protein supplement. An average amount for wintering one heifer calf is 1,400 pounds of mixed hay, 2,000 pounds corn silage and 100 pounds of protein supplement.

No additional protein should be required with grass silage but add three to five pounds of grain daily for each heifer. Use cracked shelled corn, corn and cob meal, or oats in any proportion that is most readily available and least expensive.

On farms where no silage is available, mixed hay, corn, and oats will give good results. Provide a full feed of hay plus three to five pounds of grain daily. If the quality of hay is not good, add one-half pound of protein supplement daily.

With any of these rations, a grain equivalent of 12 bushels of corn and 100 pounds of protein is sufficient for each heifer for the winter feeding. Heifers fed these rations should gain one and a half pounds daily and should continue to grow rapidly on grass the following summer.

With the exception of drought years when grass is short, the yearling summer is seldom a critical time for bred heifers. This does not mean their requirements are lower. They are still growing and, at the same time, providing nutrients for developing a calf. In most years, grass will be ample to provide the needed nutrients.

It is probable that, as bred yearling, the second winter is the most critical time in the development of replacement heifers. It is during this time that the heifer adds to her own requirements for growth, the heavy requirements for the last part of gestation followed immediately by much heavier requirements for lactation. In ad-

dition, she must resume sexual activity so that she can be rebred. If she is not fed at an adequate level during this critical period, she cannot perform satisfactorily. The most common complaint against calving two-year-old heifers is the poor rebreeding performance of the heifers, as reflected by a larger than average number of open heifers and a later calving date of the ones that do conceive. Proper energy levels after calving and through the breeding season will correct this problem.

Feeding less than optimum amount of feed is just as detrimental to the lactating two-year-old as it is to the yearling heifer. Bred yearling heifers should be fed at a level that will allow them to gain 100 pounds from fall to time of calving. Table 2 under "wintering the cow herd" shows the daily nutrient requirements for a 700-pound pregnant heifer to be 0.9 pound digestible protein and 10 pounds of TDN. Better quality roughage should be fed to these heifers before and after calving.

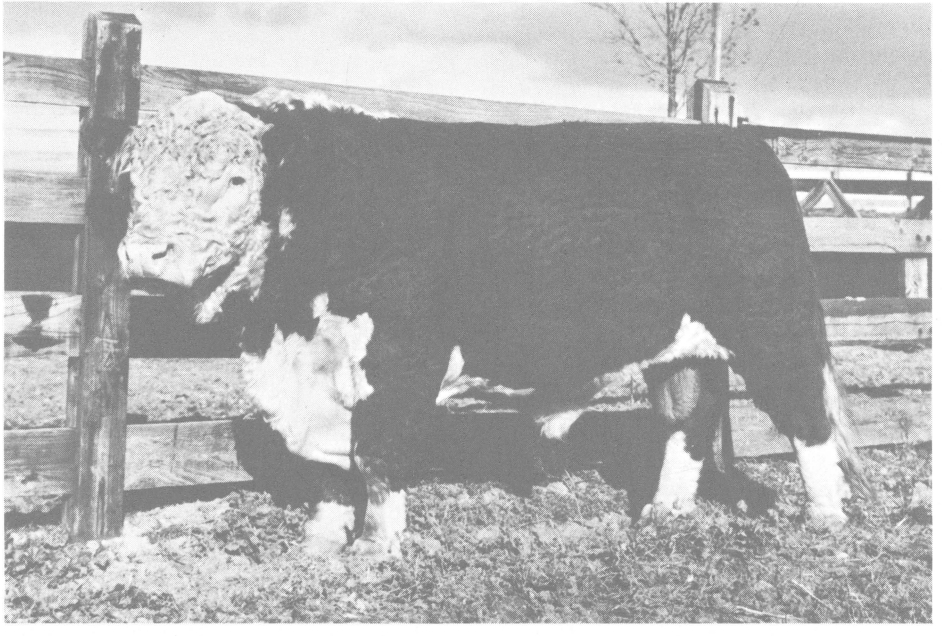
If feed supplies and management practices are not adequate to properly grow out replacement heifers, calving as three-year-olds is recommended. This practice gives the heifers more time to grow out and mature.

In contrast it has been demonstrated that excessive fattening of replacement heifers can permanently affect the milk producing ability after she calves in addition to casuing an increase in the incidence of difficult births. Maintaining beef cattle in an excessively fat condition for long periods of time usually shortens their life span as well as being extremely costly.

SELECTING THE HERD BULL

The old saying "the bull is half the herd" actually underestimates his influence. In many herds as much as 80 to 90 per cent of the progress we make in improving a beef herd is passed on through the sire. Every bull that you purchase should be a herd improver.

The reasons for the overwhelming



Modern beef bull.

impact of the sire lie in a few simple facts: (a) the bull supplies one-half the genetic makeup of each calf; (b) he may leave 25 to 30 calves in the herd each year; (c) it is possible to get a greater selection advantage in the bull because a large number of heifers must be retained each year to keep up herd numbers; (d) the daughters of a bull with a superior dam will pass on a share of this advantage for six or more calf crops long after the bull has gone to market.

First, it is necessary to decide whether you want to produce straight bred calves or to crossbreed. Breeding research indicates that about a four per cent gain can be expected in weaning weights of calves by crossbreeding. When conception and livability of calves are included, this advantage might be near 10 per cent. Another four per cent advantage might be expected by the calf having a crossbred mother. Although these percentages probably seem small, this advantage in terms of a 400-pound calf might be about 50 pounds.

An older bull that has been proven on the basis of his progeny to be a superior breeding sire should be your first choice, provided he is free of reproductive diseases. Such a bull could be available from your neighbor through exchange of bulls. Proven bulls should be available through the use of artificial insemination. Under normal pasture breeding conditions, older bulls should breed 25 to 40 cows satisfactorily in a 90 to 100-day breeding season.

If a young bull must be selected, he should be at least 18 months old. A 2-year-old bull is preferable. Using young bulls is risky since their fertility and breeding behavior tend to be uncertain. To the commercial producer buying young bulls, performance is more important than pedigree. Buy thick, heavily muscled, heavily boned bulls of good conformation and plenty of size for their age. Young bulls should be purchased from herds with complete and accurate performance testing records. Always strive to obtain bulls that are well above average in most important characteristics for the herd. Research shows that fast gaining bulls are apt to sire fast gaining calves. Size at maturity may be important, but how fast cattle reach market weight and grade is more important.

Thick, curly, silky hair coats make calves more salable. A bull transmits this characteristic to his calves. Watch for it every time you buy a bull or select replacement females.

Breeding Season

The breeding season is determined by the time the producer wants his calves dropped. Calving time is determined by the amount of protection that is available, amount of feed on hand, or the disposition of the calves at weaning time. Select calving time based on the greatest amount of economic return rather than on convenience. Keep in mind that early dropped calves should weigh more at weaning time.

Drop spring calves before the grazing season starts. February and March calves grow faster, are heavier at weaning time, and give the cows ample rest. If they are born while cows are on winter feed, few calves will get more milk than they can take resulting in less digestive upsets and digestive scours among the calves. When the grazing season starts, early calves will be large enough to consume any extra milk their mothers might give when they go to pasture. Cows are less likely to settle while loosing weight. To insure prompt settling, have them calve early so that they will be ready to gain as soon as pasture starts growing.

Size and development determine when to breed heifers the first time. The best rule to follow is to breed heifers which weigh no less than 700 to 750 pounds and are 16 months old or older. Make them weigh 900 pounds when their first calf is dropped. Experienced cattlemen say heifers that calve first as two-year-olds are better milking mature cows than those that calve first as three-year-olds. They will produce more calves and more money before they leave the herd. Heifers calving for their first time should be bred to drop calves in April or early May. Surplus milk should not be a problem in first heifers

Well grown replacement heifers.

and their calves should be creep fed. Many of these heifers can be bred to calve in March on the second round of calving.

The average gestation period of the cow is approximately 283 days or roughly nine and one-half months. Heat usually comes six weeks after calving and lasts from 12 to 24 hours. It recurs in 18 to 21 days if everything is normal.

Plan the breeding season while cows are on pasture. Turn the bull with the herd for a limited breeding season of around 90 to 100 days. Then remove the bull to a bull pasture away from the herd. This shortens the calving period and prevents young heifer calves from getting bred. In the long run, a limited breeding season increases the calf crop percentage through selection against slow breeding cows. It also aids in the control of reproductive diseases and infections.

The bull-to-cow ratio for favorable conception with natural breeding depends mostly on the maturity and fertility of the bull. Size and terrain of pasture may have some influence on the ratio. The breeding method affects the ratio, too. One bull can service more cows in a hand mating

Pasture breeding.

system than in a pasture breeding approach where the bull runs with the cows.

Table 1 suggests the number of cows recommended per bull under different aged bulls. Young bulls under 18 months of age are not recommended for natural service.

Table 1: Bull-to-Cow Ratios

Age of Bull	Number of Cows per Bull	
	Pasture-breeding	Hand-mating
18 months	10-15	10-20
2 years	15-20	25-35
mature	25-35	35-50

Hand-breeding and artificial insemination (AI) require more labor, equipment, and time; however, a greater number of cows can be mated to an outstanding bull. This means that cows must be kept in a pasture where they can be observed at least early in the morning and late in the evening. In the case of AI, a corral and chute are required for handling the cows as they come in heat.

Artificial Insemination

Artificial insemination of beef cattle has received widespread interest over the past few years. This is probably due to the increased concern for improvement of beef cattle in Ohio. Widespread use of proven superior sires is possible as a result of AI in beef herds.

AI usually involves some changes in management practices. One of the major problems is detection of heat periods. Cows must be observed at least twice a day, preferably early in the morning and late in the evening. The herd should be confined to a pasture or area in which the animals can be easily observed and checked.

Adequately designed and properly located working corrals are needed for a successful AI program. Properly located working pens permit cows in heat to be moved a minimum distance for insemination. A holding chute in the pens facilitates actual insemination.

Cows must be individually identified within the herd and adequate records kept. The actual cost of insemination compared to natural mating depends on several factors, including size of cow herd and value of bulls used in natural service.

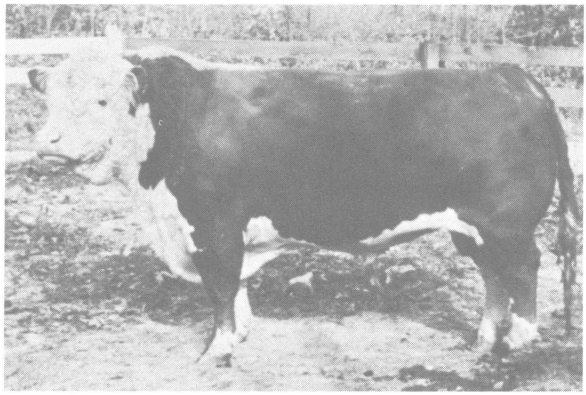
The primary advantage of AI is to enable the producer to improve the production and quality traits of his herd at a more rapid rate than is possible by natural mating. This is accomplished by using semen from genetically superior proven sires. To succeed, AI Studs must offer semen from bulls that have been proven on the basis of the performance of their progeny. To be complete, progeny information should include weaning data, feedlot performance, and carcass data. Bulls purchased on the basis of their pedigree or show ring performance cannot be substituted for progeny proven bulls. Through the use of good management and heat detection practices, one can expect at least 65 per cent of the cows to settle on the first service, 65 per cent of the remaining ones on the second service, etc. Some of the most successful beef operations do their own insemination work.

Care of bulls

When purchasing a new herd bull look for one in breeding condition. A leading authority from a bull stud stated that beef bulls in "rind-thin" condition produce the best semen. Fatness and over-condition not only cover up conformation defects in bulls but also reduce longevity and contribute to sterility and breeding problems.

If the fitted or over-conditioned bull is purchased, gradually reduce the concentrate level and increase the roughage content of the ration. Fleshy, fitted bulls should be conditioned for breeding for a period of two or three months before the breeding season. Do not attempt to condition a fat bull during the breeding season. This practice could result in lowering the percentage calf crop and extending the calving season.

Bulls should not be with the breeding herd longer than 100 days per breeding season. Following this period, place bulls in a special bull pasture or lot. Beef bulls can be run together unless they need spe-



Separate bulls from cows into special bull pasture or lot after breeding season.

cial attention because of age or injury. Provide ample area so that the bull or bulls can exercise daily.

Feed beef bulls to keep them in medium flesh so they are vigorous and active. Accustom the bull to pasture before placing him with the cows, otherwise he may loose weight if he has been confined on a grain ration. Pasture alone is sufficient in summer for mature bulls if enough of it is available.

During the winter months, good quality legume-mixed hay may be sufficient for the mature bull. If available some corn or grass silage may be included with the hay. No grain or protein supplement should be necessary if the bull is in good condition. Since bulls are heavier, they will require more feed than cows for proper maintenance.

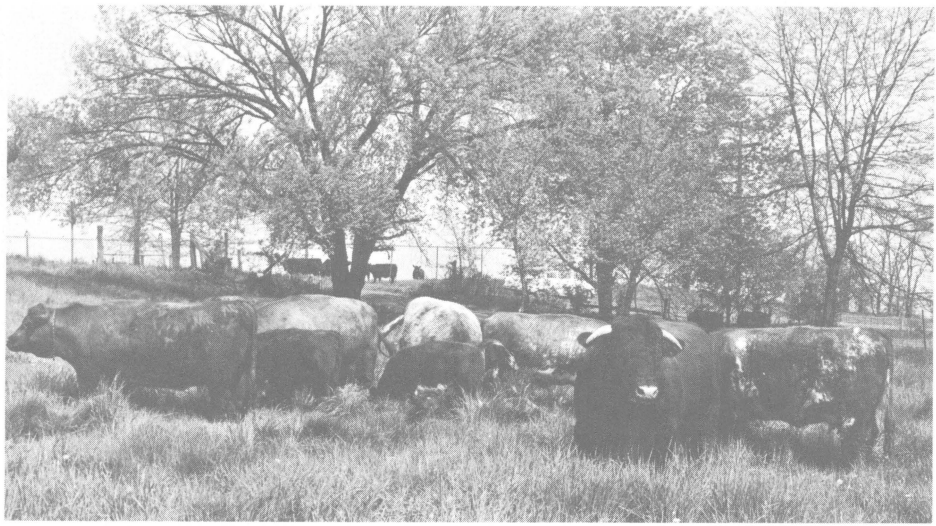
Young, aged, or thin bulls may require some grain in addition to pasture or roughage. The amounts fed should be determined by the condition of the bull. Special feeds are not necessary for a good breeding bull. Use either corn or oats or a mixture of the two for grain. Some protein supplements may be needed if roughage is corn silage or is low in legumes.

As the older bull approaches the end of his usefulness, the alert producer will have a replacement bull on hand. Try the young bull on replacement heifers and collect information on his offspring. This overlapping of bulls, even in a one sire herd, tends to guarantee success in making a change.

Rather than send a good, proven, middle-aged bull to market after two or three years use, you might sell or exchange him for one from another producer with a similar problem. Each will have the service of a desirable proven bull.

Overworking a young bull can impair his fertility for later use and reduce the time that he remains in the herd. A well-developed, 18-month-old bull can serve 10 to 15 cows. A two-year-old bull should not be pasture-mated to more than 20 cows while a mature bull can usually breed 30 to 35 cows. If a hand breeding system is used, a mature bull can be used on 35 to 50 cows. Calving in the spring and again in the fall also increases the number of cows per bull.

Large feeders are expressing considerable interest in securing entire calf crops sired by a single progeny proven bull. This is made possible through the use of artificial insemination where one bull may sire calves numbering into the thousands. Calves sired by one bull tend to perform more uniformity in the feedlot. Artificial insemination plus heat synchronization makes it possible to have closely related calves coming during a short period of time. This will result in calves more uniform in size and quality at weaning time.



Pasture provides ample, cheap summer feed.

FEEDING

Basis for a profitable commercial beef cow herd is an ample supply of pasture and forage. Cows on good pasture will not usually require supplemental feed. Since feed required for maintenance of livestock is roughly proportional to live weight, the beef herd must be fed as much as possible on low cost roughage, waste, and by-product feeds if they are to compete successfully with other classes of livestock. Maintenance costs must be kept at a minimum with the cow doing most of her own harvesting. In all beef cow herd operations, a middle level of nutrition is the most profitable. Feeding above this level increases expenses without corresponding increases in production. Undue limitations on feed quality and quantity reduce productivity, particularly the percentage of calf crop and weaning weights of calves, thus, net income is reduced.

Pasture provides the cheapest and best summer feed, and it must be available in greater amounts and over a longer period of the year than any other feed. Do not graze the same area the year around without considering the condition of the pasture. Instead, provide more than one variety of grass and use good management practices for maximum carrying capacity. Improved bluegrass, bromegrass, orchard grass or fescue used in the right combinations with legumes will produce top yields and with proper management should produce forage for a maximum grazing season.

A satisfactory farm pasture program depends upon better permanent and rotation pastures than we generally have today. Marked improvement in the production of our pastures can be accomplished through the following basic practices:

1. Have pasture land properly drained. Most pasture crops will be more productive and the land will permit longer grazing periods, especially during wetter seasons, when properly drained.

2. Mow brush and weeds to reduce competition for moisture and nutrients. Merely removing the weeds and brush that infest poorly managed pastures can increase production 30 to 70 per cent.

3. Apply adequate lime and fertilizer based on soil tests. Liming should be done first to get efficient utilization of fertilizer ingredients when applied. As a general rule, one dollar invested properly in fertilizer (with good management) will return three dollars when applied to good permanent pasture and maybe four to five

dollars on good rotation pasture.

4. Clip summer pastures to prevent seeding. This keeps the grasses more palatable. Most grasses become higher in fiber and less palatable as they produce seed.

5. Seed more appropriate seed mixtures for maximum yields.

6. Rotate pastures for better grazing management.

7. Stockpile surplus production for later use.

A good pasture program provides grazing in accordance with the requirements of the livestock. If this is not possible, the cow herd must be adjusted to the pasture. Frequently, profits from the cow herd are limited more by insufficient feed than by the number of animals kept.

Two factors have much to do with providing a balanced pasture supply. One is the **production level.** The other is the **kind of pasture.** At a high production level, pasture crops start earlier, grow more uniformly through the season, and continue to grow later in the fall. The production level is the first essential in building a profitable pasture program.

Balancing production by months at a low level means little. Production at the low level is not profitable enough to justify the effort to even out pasture feed throughout the grazing season.

However, even though raising the production level is the first and most profitable adjustment, it is not enough and should always be accompanied by selection of pasture crops, or adjustment of livestock load so as to efficiently utilize the pasture and adequately feed the animals. Introducing adopted legumes into pastures will usually increase animal performance, as well as per acre production.

Important Grasses and Legumes

Bluegrass is the most important permanent pasture grass in Ohio. It is a shallow rooted, sod forming, cool season perennial grass which is highly productive in the spring and again in the fall when properly fertilized and well managed. Blugrass is the most desirable to graze during the short period of July and August because cows will eat tall, dry bluegrass and get considerable value from it.

Orchard grass is a high yielding, tall growing, perennial, bunch grass adapted for use in semi-permanent pastures. Begin grazing orchard grass pastures early in the spring and graze heavily during May. Mature orchard grass is unpalatable, and summer production is greater when the first growth is removed early. It makes more summer growth (July and August) than any of our other grasses recommended for Ohio.

Brome grass is a high yielding, tall growing, sod forming perennial which is well adapted for use as pasture, silage or hay. It matures somewhat later in the spring, and makes less summer growth than orchard grass. It is very palatable but is difficult to seed and requires about three years of growth before it is firmly established.

Tall fescue is less palatable than other grasses recommended for use in Ohio pastures. It is well adapted to the many different soils and climatic conditions of Ohio and will provide feed under weather and fertility conditions where many other grasses fail. It is a vigorous growing, sod forming grass which produces high yields. Fescue is best used for early spring, late fall or winter grazing in southern Ohio. When cattle have access to more palatable grasses, they usually refuse to eat tall fescue. It is very competitive in mixtures. Mature fescue lacks palatability, so once a fescue seeding is established, close grazing is a good management practice.

Annual applications of nitrogen are necessary to obtain high levels of production of the above grasses. Good management practices such as proper stocking, rotating grazing and stockpiling of surplus production are also important for maximum returns.

Common white clover is the most prevalent legume in Ohio permanent pastures. It is a long-lived perennial which volunteers into bluegrass pastures when conditions are favorable for its growth. Due to its shallow root system, white clover makes little growth in periods of low rainfall.

Orchard grass starts growth early.
(Picture taken May 14)

Birdsfoot trefoil is a deep-rooted perennial legume which produces well in long lay pastures in northern Ohio. Birdsfoot trefoil stands are generally short lived in southern Ohio and yields are relatively low. Crown and root diseases are more severe in southern Ohio. For additional information on birdsfoot trefoil, see Extension Bulletin No. 401, Birdsfoot Trefoil.

Alfalfa is the highest yielding perennial legume available to Ohio farmers for moderate to well-drained soils with pH values of 6.0 or higher. It is deep-rooted, resists drought and produces well under midsummer heat. Use alfalfa only in mixtures with tall grasses with less than 40 per cent alfalfa because of problems with bloat. Alfalfa will supply the nitrogen to increase grass production. In recent years the alfalfa weevil has caused a serious threat to the use of alfalfa in southern Ohio.

Crown vetch is another legume that shows considerable promise as a pasture crop, especially in the spoil banks of eastern Ohio. Reports are that it has a deep root system and will cause no trouble with bloat. At present, seed costs are almost out of reach for the ordinary farmer.

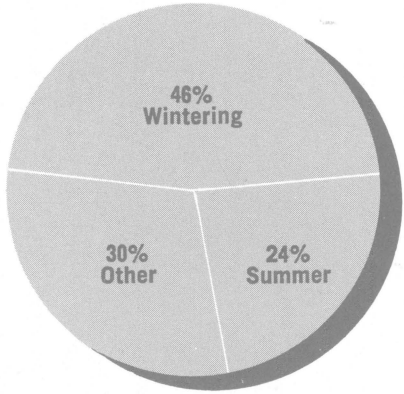
For additional information about grasses and legumes, see Extension Bulletin 417, High Forage Yields.

Wintering the Cow Herd

It is difficult to overemphasize the importance of winter management in the cow herd (Illustration next page). The feeding program is the critical factor. Two goals are important—bringing the cows through the winter in proper condition for calving and keeping feeding costs to the minimum consistent with nutritional demands.

The top cow man knows (1) what his cows produce, (2) the specific nutritional requirements of the cows, and (3) the nutrient content of feed stuffs available. He can use these three units of knowledge and develop a wintering program that does the job nutritionally at minimum cost.

The winter ration can be made up from a long list of different feeds in many combinations. Nutritional adequacy and cost are the guides. There is no one best system because each herd and each farm provide different conditions. When you are after top efficiency in the wintering of a cow-calf enterprise, there is no substitute for some hours of pencil-pushing to find your own most desirable feeding program.



Production costs according to per cent of total annual cost of maintaining the beef cow

The cow herd represents different individual feeding demands. It is a mistake to consider the herd as a single feeding problem. The cows are not all the same. Three different groups within the cow herd need different feeding programs: (1) replacement heifers need to be fed to gain at a specific rate; (2) young and mature cows in thin condition; (3) mature cows in proper condition.

Table 2 sets out the nutritional requirements of the different groups of cows within the herd. It presents the information in terms of daily requirements.

Two common errors in winter management are (1) furnishing cows high-quality feeds that are too expensive and (2) giving them too much of the more costly feeds. Alfalfa hay or haylage, corn silage, and grain fall into this costly feed category. These are too palatable for one to give the cows all they will eat. Cows will eat more than they need and more than you can afford in terms of low wintering costs.

Winter pasture offers farmers with beef cow-calf herds in southern and southeastern Ohio a means of reducing costs. By accumulating the feed in the field rather than harvesting, storing, and handling

Table 2: Daily Nutrient Requirements of Beef Cattle—Wintering Pregnant Heifers and Mature Pregnant Cows—Based on Air-Dry Feed Containing 90 per cent Dry Matter.

Body Weight Lbs.	Average Daily Gain Lbs.	Daily Feed Per Animal Lbs.	Total Protein Lbs.	Dig. Protein Lbs.	TDN Lbs.	Calcium Lbs.	Phosphorus Lbs.	Vitamin A. equivalent (IU)
				Pregnant Heifers				
700	1.5	20.0	1.5	0.9	10.0	0.033	0.031	20,000
900	0.8	18.0	1.4	0.8	9.0	0.029	0.026	18,000
1,000	0.5	18.0	1.4	0.8	9.0	0.029	0.026	18,000
				Mature Pregnant Cow				
800	1.5	22.0	1.7	1.0	11.0	0.035	0.033	22,000
1,000	0.4	18.0	1.4	0.8	9.0	0.029	0.026	18,000
1,200	0.0	18.0	1.4	0.8	9.0	0.029	0.026	18,000
1,200	—0.5	17.6	1.3	0.8	7.5	0.029	0.026	17,000

Based on Nutrient Requirements of Beef Cattle. No IV Publication 1137 National Reasearch Council, National Academy of Science.

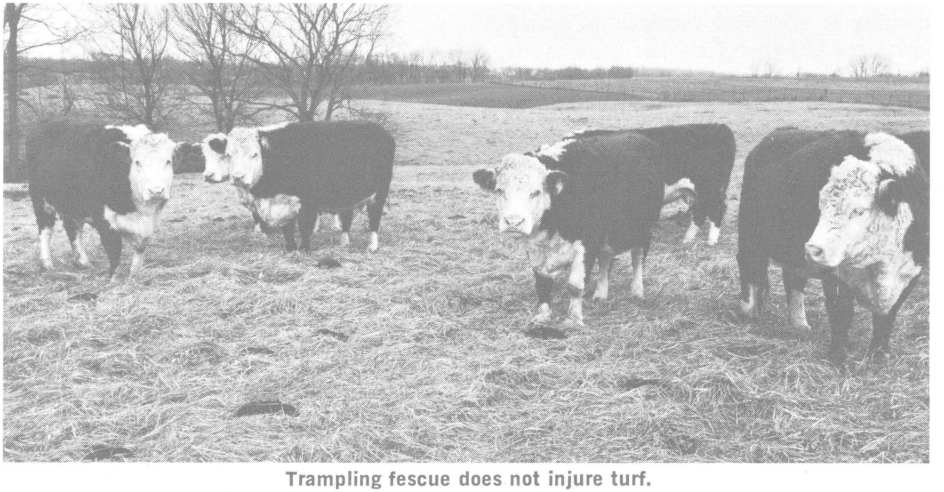
Tall fescue in round bales.

the forage, the cost and labor of winter feeding can be substantially reduced. Costs of bedding and manure hauling can be eliminated.

Using tall fescue as the forage crop, regrowth is baled in late June into round bales and left in the field. The round bales shed rain and snow and, together with the regrowth, make excellent late fall and winter grazing. Experience shows that field-stored forage has adequate quality to maintain beef cows in good condition.

Fescue is a cool season grass, which actually grows some in this area during the winter and is more palatable during the fall and winter than any other season because of the high concentration of soluble sugars. Trampling during the fall, winter, and spring months does not injure turf. The sod should be well established before using fescue for an entire grazing season.

In Ohio research using strip grazing, the winter pasture with the baled hay and standing growth carried two cows



Trampling fescue does not injure turf.

per acre for a 16-week period. The cows wintered in good health, stayed in good condition, and dropped good healthy calves.

The use of electric fence to strip graze the bales and regrowth can increase the carrying capacity by 50 to 60 per cent over permitting the herd access to the entire field.

Cows wintered on hay alone need approximately two pounds daily for each 100 pounds of body weight. Hay silage can be substituted for hay at the rate of three pounds of silage per pound of hay. Two pounds of corn silage will replace a pound of hay but will require additional protein supplement.

If cows are self-fed or full-fed roughage, they will eat more than they need. This practice saves time and labor but roughage is wasted. Consider a ton of hay per cow as an average amount for the winter ration.

It is a common practice in Southern Ohio to winter beef cows on roughage alone. Good quality grass hay will do an adequate job of supplying the necessary nutrients until the last two months of pregnancy and while the cows are nursing calves. At this time some legume hay or one pound of protein supplement should be fed.

Start winter feeding when pasture conditions demand it and before the cows lose much weight. Supply feed in small amounts at first and increase as grazing runs out. Usually, feed the poorest hay or silage first while cattle have summer time-stored supplies of minerals and vitamins and save the best roughage for late winter and the calving season. In many areas in Ohio where there is adequate drainage, the cow herd can be fed on permanent pasture sod. This saves cleaning and manure hauling during the busy spring season.

Feed cows and yearling and heifer calves separately. Give cows the coarse, poor quality roughage and save the choice feed for replacement heifers and heifer calves because their requirements are higher in proportion to total consumption.

Let cow herds make maximum use of stalk and stubble fields in the fall and winter until weather interferes. Cleaning up these fields offers a source of feed that might otherwise be wasted and reduces the maintenance cost for the herd.

Following are one day rations for wintering 1,000 pound cows:

1. Twenty pounds of grass or mixed hay.
2. Forty pounds of corn silage plus one-half pound of protein supplement. No protein is needed if urea is added to silage.
3. Thirty pounds of silage and 10 pounds of legume or good mixed hay.
4. Sixty pounds of grass silage.
5. Twenty pounds of ground corn cobs and three pounds of protein-molasses supplement that has been fortified with vitamin A.
6. Twenty-five to 30 pounds of silage, and all the straw the cows will eat, plus two pounds protein supplement.
7. Grass regrowth or winter grazing plus one pound protein supplement. Two pounds of protein supplement should be fed to cows nursing fall calves.
8. Pregnant cows gleaning stalk and stubble fields may be self fed protein by using salt to regulate its consumption. Between 20 per cent and 30 per cent salt will probably be needed to get the proper protein consumption.

Increase the feed allowance for nursing cows four to seven days after calving. Producing milk for the calf requires more feed for the cow than during gestation. Their condition should be the guide and if cows are thin, feed more roughage or add grain to maintain the body weight. First calf heifers need more feed than older cows because of their additional needs for continued growth.

Early lactation is a very critical period for the first calf heifer. Unless extra energy is provided, first calf heifers will not come back into heat promptly after calving, resulting in late calves, or a lower per cent calf crop as three year olds.

CONTINUOUS PRACTICES

Use free choice salt and a simple phosphorus mineral continuously.

Constantly be on the watch for diseases, injuries, parasites, pink eye, foot rot, and lice.

Check herd periodically, summer and winter. Detect trouble ahead of time and stop it early.

Identify each cow with a permanent identification.
Supply fresh water, sufficient feed, ample pasture, shade in summer and protection in winter.

Build enough pens, chutes, gates, and handling equipment.

Always be on the lookout for a proven or performance tested bull that will improve your herd.

AVOID:

Summer born calves, extended calving season, expensive winter feeding program, and improper castration and staggy calves.

BEEF CATTLE MANAGEMENT CALENDAR
COW AND CALF HERDS

(Main Herd to Calve in February and March)

January

1. Rotenone treatment for grubs once each month in January, February, and March unless animals were treated in October.
2. Once per day feeding of cows if removed from stalk fields or insufficient pasture.
3. Collect medicines and supplies—iodine and penicillin for the calving season.
4. Remove bulls from cows that are bred for fall calving.

February

1. Provide protection for cows that are calving and check twice a day after calving starts.
2. Be on hand to assist difficult births, iodine naval cords and be sure calves nurse. Identify calves by ear tag or tatoo and record birth, sex, and dam.
3. Castrate bull calves.
4. Dehorn all calves if not polled.
5. Vaccinate for blackleg.
6. Put orphan calves with any cows that lose their calves.
7. Increase feed on cows as they calve. Cows nutrient requirements double after calving.
8. Spray for lice.
9. Annual Bangs and TB test prior to turning out to pasture.
10. Buy a progeny proven or performance tested bull with above average records and at least choice conformation.

March

1. Most difficult month of the year, nutritionwise. Vigor is low and diseases and trouble may start. Feed the best feed at this time, supplement with Vitamin A.
2. Continue calving procedures. Check cows constantly to see that all four quarters are being properly nursed.
3. Continue dehorning and castration on all calves including those from late calvers.
4. Yearling replacement heifers may need worming. Use phenothiazine at two-week intervals.

April

1. First calf heifers will calve. Keep near barn for easy access to calving problems. Increase energy level of feeding at calving.
2. Turn cows on orchard grass permanent pasture as soon as it is four inches tall.
3. Repair winter damage to fences, gates, corrals, lots, and etc.
4. Guard closely for bloat first few days animals are on legume pasture.
5. Check bull for fertility.

May

1. Turn bull in with cows May 1. Yearling bull, 10 to 12 cows; two-year-old bull, 20 to 25 cows; mature bull, 35 to 40 cows.
2. Supply salt and phosphorus mineral free choice. More salt is eaten on early, lush pasture.
3. Control flies with back rubbers.
4. Use quick methods of castration and dehorning plus fly repellent (smear 62) applications through the summer months.

June

1. Check for repeat breeders.
2. Market cows that are not calving or that have been culled for other reasons.
3. Recheck all calves for horns and castration failures. Slips from earlier work should be corrected now. Use smear 62 as fly repellent.
4. Vaccinate for blackleg and malignant edema if not already done.
5. Start creep feeding calves if this is to be done.
6. Vaccinate replacement heifer calves for Bangs between 90 and 180 days of age.

July

1. End breeding season after 100 days to prevent early born heifer calves getting bred.
2. Place bulls together in a small bull pasture after breeding season.
3. Yearling replacement heifers' breeding season should start July 1.
4. Rotate pastures and feed supplemental feed if pastures are extremely short.

August

1. Control horn flies and lice.
2. Check for pink eye and apply controls.

September

1. Make replacement selections.
2. Make consignments for Demonstrational Feeder Sales.
3. Remove bulls from yearling replacement heifers
4. Plan to hold calves weighing less than 350 pounds. Dispose of them later when heavier or carry over until spring sales Light calves will lose money.
5. Start calving if fall calving is a practice used. Calves are ideal for spring demonstrational sales.
6. Start creep feeding fall-dropped calves.

October

1. Deliver calves to Demonstrational Feeder Sales or other appropriate disposition.
2. Wean replacement heifers and start feeding for gains of 1 25 pounds daily. This gives cows chance to gain weight before bad weather.
3. Dry up cows on poor pasture. Sell remaining culls based on age, color, disposition, milking ability, etc.
4. Check pregnancies and sell open cows.
5. Grubs can be controlled by systemics this month only.
6. Use phenothiazine to treat internal parasites of any calves kept.
7. Might be a good time to buy young bulls for next year.

November

1. Turn cow herd into stalk field if available.
2. Start feeding cows if no pasture is available.
3. Continue replacement heifers on grain and use any good grazing available.
4. Bred first calf heifers must be fed to gain around 100 pounds during winter.
5. Bulls should be started on feed if pasture is short and they need to gain weight.
6. Spray for lice.

December

1. Continue to glean stalk fields.
2. Continue feeding once a day if pasture is not available.
3. Clean barns and stalls if calves are to be born inside.

Stocking Rate

Proper stocking rate is a management practice that has as much effect on net income from a cow and calf operation as any single factor Stocking rate merely means the matching of the number of cattle and the amount of pasture available and the stocking rate varies from year to year depending on the amount of rainfall Understocking indicates that more animals can be carried, resulting in increased income, because increasing the number of cows in a herd has little effect on overhead expenses of the operation.

Overstocking necessitates extra feeding and usually results in higher death rates among cows and calves, lighter birth weights, smaller daily gains of calves, lighter weaning weights, lower feeder calf grades, smaller per cent calf crop at weaning, and more calving difficulties, resulting in less total income The person who brags about high carrying capacity and poor daily gains is usually stocking too heavy.

The best management is to have some surplus feed for an emergency or a harvested supply carried over in storage Proper stocking rates must be determined by experience Overstocking results in forced marketing during dry years and this usually means selling on a depressed market.

Continuous grazing reduces total yields and shortens the life of tall growing grasses and legumes. If you divide pastures into at least two or three fields, you can use one while the others are recovering and making new growth. After animals are moved from one pasture to another, clip the remaining forage from the pasture just grazed to improve the quality and yields of future growth. This practice also eliminates weeds before they go to seed.

Plan for several different pasture crops so that you will have fresh green pastures from early spring to late fall. Table 3 on **pasture calendar** will help you select a combination of forage crops for a good continuous pasture program for Ohio.

Table 3: Ohio Pasture Calendar

Estimated availability of forage for grazing expressed by months in animal units per acre available

CROP	Total Ave Pasture Days Per A. per Yr.	ANIMAL UNIT GRAZING DAYS/ACRE*											
		A	M	J	J	A	S	O	N	D	J	F	M
Alfalfa mixture No hay removed	143	3	28	32	34	12	18	12	4				
Alfalfa mixture After June hay	69				14	20	19	12	4				
Birdsfoot Trefoil	87		12	32	22	14	7						
Bluegrass (untreated)	43		12	14	3	2	5	5	2				
Bluegrass L(60N)P-K	134	20	44	34	7	3	11	11	4				
Bromegrass L-N-P-K	137	3	35	34	12	10	16	18	9				
Clover-Timothy	99	3	26	26	14	7	11	9	3				
Clover-Timothy After June hay	47				8	16	12	8	3				
Fescue L-N-P-K	242	28	48	46	12	10	20	28	25	15	10		
Fescue (round bales) L-N-P-K	218			(a)					30(b)	60	60	56	12
Orchard Grass L-N-P-K	181	15	43	43	25	20	15	15	5				
Sudan	120			42	42	47	20	17					
Corn Stalks	60								30	20	10		

* These are average values Production might be much higher with good management and high fertility.

a Growth was baled into round bales and stockpiled in the field

b Acreage divided for controlled grazing Use can start anytime needed

c Grazing must be avoided between first and definite killing frosts because of prussic acid content of regrowth shoots

Good water supply is essential.

Salt and Minerals

Thirteen mineral elements are required in the ration of cattle, however plants that cattle eat also need these elements. Therefore, cattle can obtain practically all their mineral needs from the common feeds. All of these elements are essential to the general well being of the animal and are at least indirectly related to optimum reproductive performance.

A problem in mineral nutrition of cattle can be caused by (1) a simple deficiency due to an inadequate amount of the element in the ration; (2) the occurrence of the element in the ration in a form not available to the animal; (3) the existence of certain imbalances between mineral elements of the ration, or; (4) combinations of these factors.

Trace mineralized salt should be fed free choice in loose form to cows throughout the year. Calcium and phosphorus are the two minerals needed in the next largest amounts. Ground limestone usually is the cheapest calcium supplement while phosphorus may be supplied in the form of steamed bonemeal, dicalcium phosphate or biofos. Both calcium and phosphorus supplements usually are fed free choice in mixtures with trace-mineralized salt. This mixture should supply all mineral elements needed by beef cattle in Ohio. The addition of ample phosphorus may result in an extra 200 pounds per cow on the condition of the breeding herd.

Cattle need minerals more in the winter than in the summer, but they will eat more salt in the early part of the grazing period than in the latter part. Free choice salt and free choice mineral should be available to all cattle at all times. On the average a beef cow will probably require approximately 20 pounds each of salt and mineral per year.

Homemade mineral feeder.

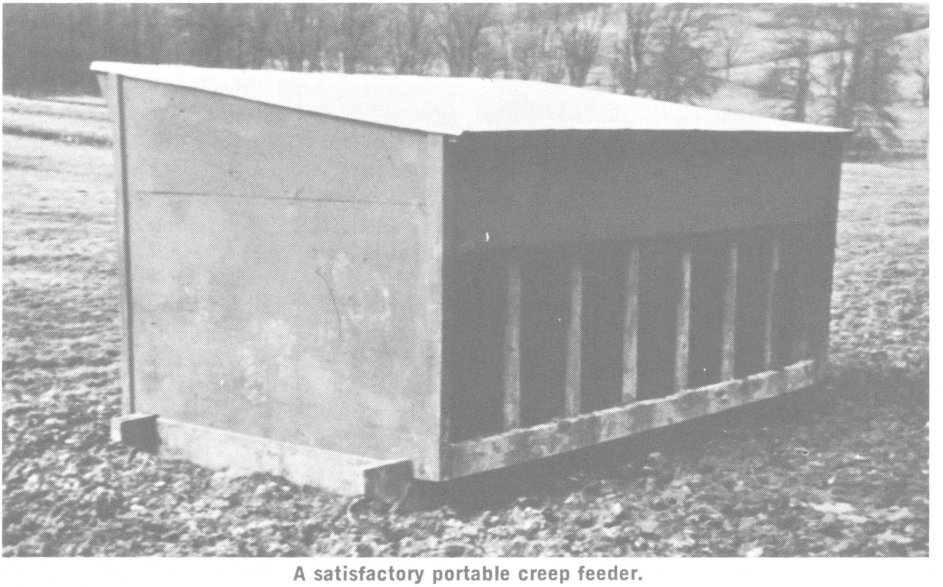
Creep feeding is the feeding of concentrates to nursing calves in enclosures that cows cannot enter. Giving nursing calves access to a concentrate mixture in a creep placed in the pasture where shade and water are available and where cows gather usually increases weight and grade at weaning time. The profitability of this practice depends upon the relative creep feed cost and the market value of the calves. Creep feeding also benefits the cow because she is spared some of the demand of the creep-fed calf's appetite and the cow may be as much as 25 pounds heavier when her calf is weaned. That extra weight is worth something—increased sale value if the cow is culled—or lower winter feed requirements when she is carried through the winter.

Creep-feed calves when (1) you are after maximum weight, grade, and bloom at weaning; (2) you plan to sell the calves at weaning; (3) you plan to feed out your own calves on a high energy ration; (4) the calves are maintained in a drylot; (5) the calves are dropped in the fall; (6) the calves need supplemental feed because their dams are first-calf heifers or because they are milking poorly due to inadequate pasture; and (7) you are a purebred breeder and selling at an early age.

Do not creep-feed calves when (1) you plan on wintering fall-weaned calves on a high roughage growing ration; (2) their dams are excellent milkers with access to abundant pasture so that there is little weight advantage from creep-feeding; and (3) the cost of creep-feeding is not favorable relative to feeder calf prices.

Allow an average of 500 pounds of feed per calf per year. In years of lush pasture, this amount is less and in dry years, more. A satisfactory ration is a mixture of whole oats and shelled corn. Later in the pasture season, protein supplement may need to be added at the rate of nine parts grain to one part protein.

The most important advantage of creep feeding may be the ease with which calves go on feed when placed in the feedlot. This reduces the stress on the calves and avoids the incidence of shipping fever, red nose, or BVD.



A satisfactory portable creep feeder.

Dehorning

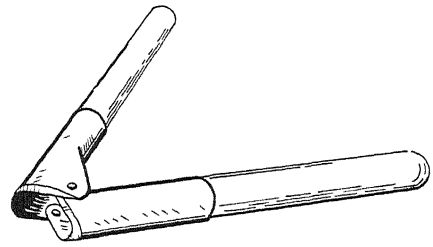
Dehorning is a management practice absolutely necessary in a good commercial cow-calf program. The cattle feeder will pay at least 50 cents per hundred weight more for calves that have been properly dehorned than for the same cattle with horns. Loss of time and feed while cattle recover from dehorning plus the risk involved makes the difference. Dehorned cattle bring more money when they go to slaughter because they will have fewer bruises.

The use of a polled bull offers the easiest method of removing the horns from the calf crop. Since polledness is a simple dominant characteristic, the use of a pure polled bull should result in the calf crop being hornless.

Dehorning calves with caustic soda or potash stick or paste should be done when calves are between birth and two weeks of age. Dehorning at this young age results in less stress on the calf. Clip the hair around the horn buttons and scrape the buttons until they are raw. Apply material according to the manufacturer's directions on the container.

Observe these precautions: Do not turn the calf out in rainy weather for a few days. This prevents the caustic material running down on the calf's face or into its eyes. Keep the calf away from its dam after treatment until the paste dries because it will burn the teats or udder. Do not lick or touch the caustic material with bare skin or hands.

Horns can be removed at any season of the year. During fly time, take proper precautions by using EQ 335 or Smear 62 over the wounds. For best management, horns should be removed at birth or before the calves are three weeks of age. Small horns may be removed mechanically by use of a Barnes type dehorner, tube type dehorner, spoon type dehorner, or elastrator. The Barnes type dehorner is probably the most widely used mechanical method in Ohio on calves. It is a pinchers type dehorner. When properly placed over the horn, a ring of skin is removed with the horn. This method can be used when the calf is from two months of age to weaning. If used during fly season, use FQ 335 or Smear 62 on the wound.



Barnes type dehorner.

A new method is the electrical dehorner—an electrically heated iron applied to the small horn button and held until the horn area is sufficiently burned and seared. Bleeding is held to a minimum and healing is quite rapid.

Castration

Castration is another management practice absolutely necessary in a good feeder calf production program. The main reasons are (1) castration prevents production of undesirable calves and heifer calves from being bred prior to weanning, and (2) steer calves are preferred by feedlot operators in the production of slaughter cattle.

Bull calves should be castrated as soon after birth as possible, preferably within the first three weeks of age. The job is easier and the shock is less. Bull calves are frequently permitted to grow to four or six months of age before castration. Delay to this age makes the job more difficult and increases the risk of death or stagginess. Castration and dehorning should be done at the same time.

The successful performance of any job requires use of the proper equipment. Essential materials and equipment for castration are (1) lariat, (2) light rope for securing legs, (3) disinfectant, (4) knife,

(5) fly repellant, and (6) antiseptic powder. Much of the danger in castration can be controlled through care in cleanliness and in disinfecting of hands and equipment. The first step for an efficient job of castration, as with any job performed on cattle, is proper restraint. The following methods are used.

1. The knife method of castrating is positive and safe if ordinary cleanliness is practiced. Some cattlemen prefer to cut off the lower third of the scrotum and remove the testicles. Others prefer to slit the scrotum up and down the sides next to the legs. In the latter method make sure the cuts are low enough to insure drainage. Use a good disinfectant to sterilize the knife, hands, and scrotal area before starting, and if possible after each operation. Use fly repellant during fly season. Provide clean quarters for the calves or leave them out on pasture.

2. The elastrator or rubber band is another method which some people prefer. The band is stretched by an instrument and slipped over the scrotum and above the testicles. The band contracts and stops circulation causing the lower part of the scrotum and testicles to shrivel and drop off in 4 to 6 weeks, or sometimes longer. The elastrator must be used while the calves are quite young. This method requires more time in healing and exposes the animals to infection longer than many cattlemen like. *Caution:* Be sure that both testicles are below the rubber band.

3. The burdizzo or clamp is an instrument that pinches off the cords and leaves the testicles in the scrotum from which they are absorbed. These clamps are satisfactory only when the instrument is in proper adjustment and when properly used. Too many times the cords are not completely severed and slips occur which result in staggy steers. Staggy feeder calves are discounted by feeder buyers because they sell for less than steers when sold for slaughter. Bull calves as a result of slips may result in bred heifers in the calf crop.

Calf Crop Percentage and Weaning Weight

Of all the beef cattle traits with economic value, no two traits affect commercial cow herd profits more than calf crop percentage and wearning weights. Both can be affected substantially by proper and timely management. Many ways exist to combine calf crop percentage and weaning weights to maximize profits in Ohio. The cost of either or both can be increased to the point where the last increment of cost is equal to its additional return.

Calf crop percentage is the per cent of cows in the herd during the breeding season that raise calves to weaning age. Ohio beef herds should strive for at least a 95 per cent calf crop. This percentage can be greatly affected at two different periods of time—first, during the breeding season when the conception rate must be high, and again at calving time when a high percentage of calves must be born alive and live to wearning age.

Studies show that the main reasons for low percentage of calf crop are (1) lack of attention by the producer at calving time, (2) unsuitable buildings or lots, (3) drowning of young calves, (4) failure of cows to conceive, and (5) a lack of proper culling. Nutrition has a big influence on breeding. Cows gaining rapidly just before and during the breeding season show shorter periods between calving and the first heat period and tend to have higher conception rates. Normally, cows on good improved pastures during the breeding season will be gaining weight and a higher conception rate should be expected.

When the breeding season extends into July and August and the rainfall is less, resulting in poor forage production, the cow's energy intake may not be adequate. Adding a high energy feed such as four to six pounds of corn daily two to three weeks before and during the breeding season should improve conception rates.

Limit the breeding season to no longer than 90 to 100 days. A cow should settle in two heat cycles of 21 days each if she is in good reproductive health and the bull is healthy and fertile. Cull any cow that does not settle during the limited breeding season. There is no profit in feeding an open commercial cow for a

year; she will eat up the profit of at least 2½ calves.

Give each cow in the breeding herd a rest period of at least 60 days between calving and rebreeding. This rest period is necessary so that the reproductive organs of the cow can return to a normal, non-pregnant condition. The milk production system also needs a rest; therefore, wean calves no later than 9 to 10 months of age.

After the breeding season, the breeder should watch for abortions or cows returning to heat. Isolate at once cows that abort. Consult a veterinarian immediately to determine the cause of abortion. Aborted fetuses and accompanying material should be examined by the veterinarian and buried or burned to prevent spread of any possible contagious reproductive diseases.

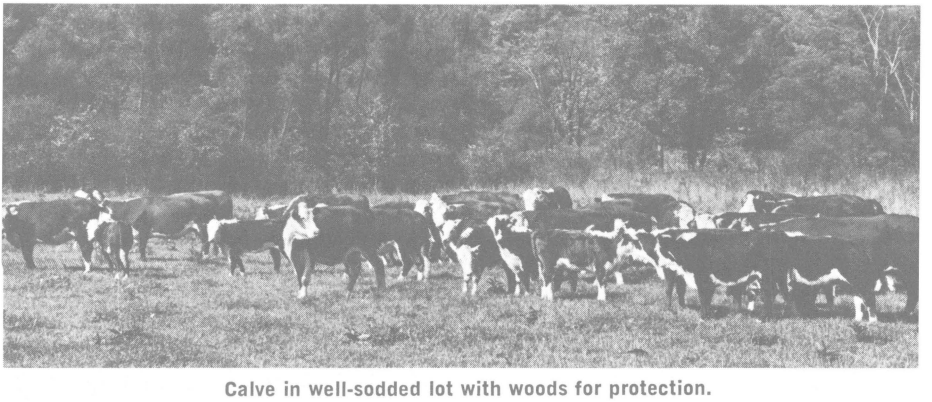
Identify each cow in the herd by tags, hot brands, freeze brands or other methods so that accurate production and breeding records can be kept.

Cows can be pregnancy tested accurately by an experienced veterinarian 45 days after the breeding season. Keep only females that conceive readily and deliver strong calves with little assistance. Plan to keep the sure breeding, good producing cows in the herd as long as they are performing. Mature cows usually wean heavier calves and require less assistance at calving time. Calving difficulties can be tolerated in first calf heifers but not in mature cows. Heavy culling for poor performance will, in time, help to raise the per cent calf crop.

The gestation period of beef cattle normally varies from 278 to 285 days or approximately 9½ months. During the calving season, the breeder should observe the cow herd closely at least three times daily. If the cow has been in true labor for more than two hours or if labor is unusually severe, experienced assistance should be given. Many times a minor malposition (a front foot turned back) may be easily corrected and the calf saved. However, if the calf is severely malpositioned, or too large for normal delivery, consult a veterinarian. To avoid infection of the vulva and surrounding area, the arms of the operator, and all instruments should be thoroughly cleaned and disinfected.

If the placenta is not completely expelled within 72 hours after birth (retained placenta), it should be removed by an experienced operator. Place uterine capsules or bollettes in the uterus to help prevent infection. Removing placental membranes too early or incorrectly may allow infection to enter the blood stream or cause infertility.

The best place to calve a cow herd is on a clean, well-sodded pasture with a small wooded lot or hills for shelter. Calving in muddy lots predisposes cases of calf scours which are very difficult to cure and which sometimes set a calf back sever-



Calve in well-sodded lot with woods for protection.

ly for an indefinite period. A shed may be useful only when cows calve in severe weather. Once the calf has dried off and nurses, the cow and calf are ready to join the herd outside.

If the new calf is found immediately after birth, remove the placenta from its head and clear the calf's mouth of mucus and other materials which might interfere with breathing. The new born calf should suckle within two hours after birth. Assist calves that are too weak to nurse. It is essential that the calf receive the colostrum (first milk) of its mother. Colostrum is high in vitamin A, if the cow has been properly fed and has a good store of vitamin A in her body. The calf may be born with very little or no vitamin A reserve and the vitamin A of the colostrum aids in keeping down respiratory and other infections. Colostrum further helps in activating the digestive system and provides additional protection against infection and disease through its antibody content.

Small calves occasionally drown in streams or during floods. These losses can be prevented by keeping the calving herd away from streams during or soon after calving. This extra caution can save many calves and help increase the number of calves raised.

Dehorn, castrate, eartag and record date of birth before calves are one week of age.

Calving seasons vary throughout Ohio and can exert as much influence on the weaning weight as any other factor. Assuming that a calf weighs two pounds per day of age at weaning—other factors being equal, then a calf that is nine months old at weaning should be heavier than a calf that is six months old. As a result, early calves (January, February, or early March) should be heavier at weaning time (for the October sale) than calves dropped in the latter part of April and May while the cows are on pasture.

Steer calves selling through the graded October sales have been averaging around 450 pounds. It is conceivable that by calving earlier this weaning weight could be increased by at least 100 pounds per calf. Also, moving up the calving date would result in the cow working more days of the year, thus reducing the number of days that she is loafing and will need to be on relief.

Identify, dehorn, and castrate calves before they are one week old.

Selection of replacement heifers for heavy weaning weights involves selecting dams for their milking ability as well as for faster growing calves. Use of fast gaining bulls also increases the weaning weights of the calf drop and may carry over when these heifers are retained for the cow herd. Figures show that heritability of weaning weight is low and progress by breeding is slow.

Recent beef cattle research indicates that crossbreeding will have considerable affect on both calf crop percentage and weaning weight. Greater fertility plus heavier weaning weights may add up to a 10 to 15 per cent advantage for crossbreeding at weaning. Generally, the greatest advantage of heterosis or crossbreeding results in the traits where the heritability is low. Some of the advantages showing up are: (1) cows conceive quicker, (2) lower embryo loss, (3) fewer calf losses after birth, and (4) heavier weaning weights.

Indiscriminate crossbreeding without attention to generation involved, or with inferior cattle, misses the advantages of crossbreeding and retains the disadvantages. It is so complicated that a producer may end up with a bunch of genetically confused animals unless he is prepared for crossbreeding and knows what is necessary to reap the benefits.

PRODUCTION TESTING

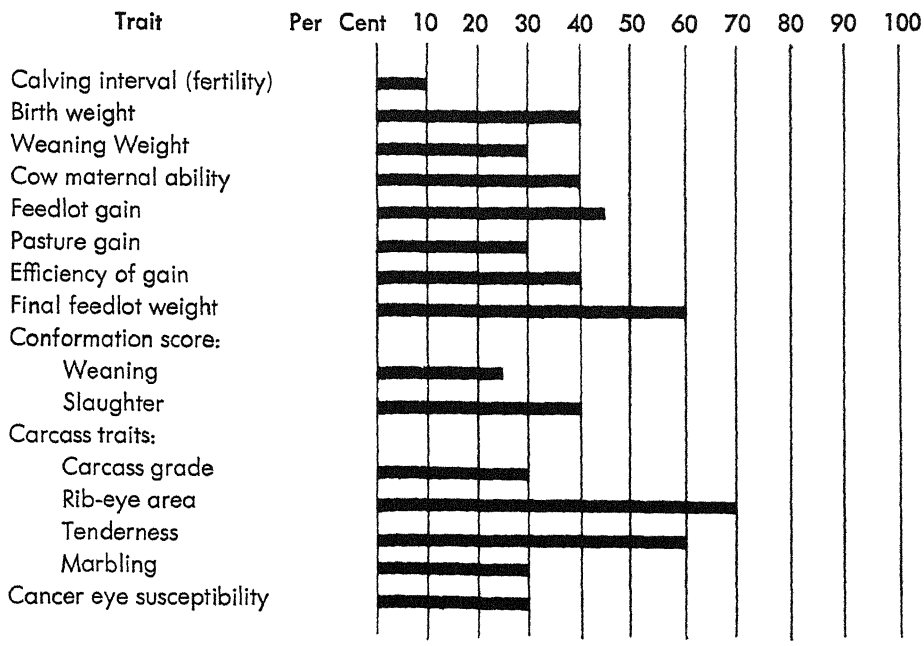
Beef Production Testing is a method of securing records by which selection standards and practices may be developed and used to improve the quality and producing ability within the herd. Much research work in the past 25 years has proven that there are wide variations in birth weights, weaning weights, rate of gain, efficiency of gain, type and carcass traits. These variations continue to exist despite the general level of improvement that has been taking place. This information indicates that the amount of influence assigned to heredity varies between factors, but it is sufficient in all cases to justify record keeping for selection purposes.

The estimates of heritability listed in the chart are a composite of many research projects throughout the United States. The heritability can be expected to vary in different herds, however, because of variations in genetic makeup and environment. Their expression in any particular herd depends on a similar environment for all animals in the herd. Good management is a basic requirement for herds expecting to make full and accurate use of production records.

Considering the above information, it seems logical that beef producers should be interested in using some practical method that will select from their herds the best producers and, at the same time, detect the poor producers so they can be culled. The Ohio program will work for culling either bulls or females and can be used in either commercial or purebred herds. Most breed association programs are similar to the Ohio program.

Production testing requires numerous calculations and accurate record keeping. The first step is permanent identification of all animals in the herd. Any form of identification is acceptable providing it is a positive and easy way to identify the individual. Registered breeders already

Table 4. Heritability estimates of some economically important traits



Freeze branding as a means of identification.

have this job done with the tattoo. Freeze branding may be the answer for the commercial herd because successful brands permit reading of the numbers without clipping hair from over the brand.

Traits of major importance in the economical production of highly desirable beef that should be evaluated and given attention in a production testing program for the genetic improvement of beef cattle are: (1) fertility or reproducitve performance, (2) mothering or nursing ability, (3) conformation as it contributes to carcass desirability and structural soundness, (4) rate of growth, (5) efficiency of production, and (6) longevity.

The Ohio program uses a 205-day weaning weight ratio, type score, and ratio index as well as a cow MPPA (most probable producing ability). The ratio, index, and MPPA values are calculated on a "within herd basis" for selecting replacements and culling poor producing individuals.

All completed field records are submitted to the Ohio State University where they are computed by electronic data processing (EDP). EDP lists the computed records two different ways—by sire groups and by potential replacements by sexes of the calves. EDP will also compute all individual lifetime accumulated performance records for each cow in the herd. This accumulated cow record is printed on a separate page for each year, thus eliminating the time consuming chore of transferring the information to an individual cow production record brought up-to-date each year.

From the standpoint of genetic improvement for the entire beef cattle industry, production testing will have the greatest impact through application by purebred breeders or in seedstock producing herds. The commercial producer can make the most effective use of performance testing by selecting bulls on the basis of records from purebred herds that are on a systematic testing program. Over a period of time, the inherent productivity of any herd is largely dependent upon the genetic merit of the bulls used.

Production testing is an additional aid toward breeding better cattle, not an end in itself. Successful beef cattle breeding cannot be reduced to the basis of a few figures, as there are too many important and essential requirements in sound breeding animals that cannot be measured. Science and art must work together and not be opposing forces in the field of beef cattle improvement. The cow man must still use judgement, experience, and eye appraisal in selecting the animals to make the records.

OHIO APPROVED SALES

A feeder cattle sales program properly organized and designed to fit the needs of cattle producers can be a powerful stimulant to the state's beef industry. It provides a market for any given quality of cattle that the producers choose to produce, and in most cases the highest quality cattle are the ones that will pay the most returns. In Ohio the feeder sales will increase the price $1.50 to $2.00 or more per hundredweight over other calves in the state not sold through the special sales. Most calves sold at home are sold subject to prices received at the nearest special feeder calf sale.

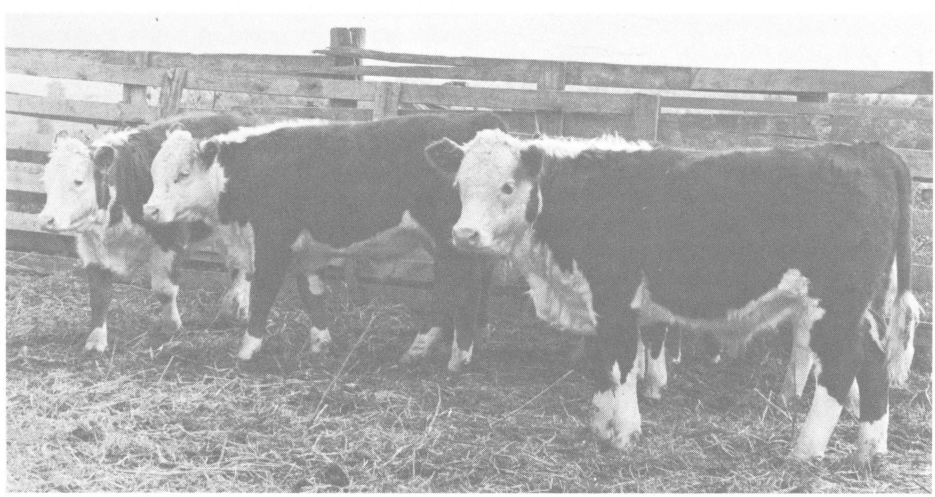
The feeder calf sales program is especially useful to the small producer. His calves can be grouped by breed, sex, weight, and grade with calves of other producers into uniform lots that are in demand by the cattle feeder. An area feeder calf sales organization can collectively establish a reputation for cattle produced by the group and achieve all the benefits that a large producer has.

To be fully effective there must be an organization of feeder calf producers governing each local sale and there should be an overall state organization to set up uniform, minimum requirements and regulations which local organizations follow. Due to location differences, each area committee will have certain operating procedures and regulations according to local problems. With proper state and area organization, Ohio can quickly establish a reputation for its cattle.

The Ohio graded feeder cattle sales are held mostly during the fall season (October) and the latter part of April in the spring. Sales containing 1,000 to 1,200 head of feeders have sufficient size to attract buyers and command top dollars for the cattle.

Standards developed for the "Ohio Approved" graded sales are as follows:

1. Sponsored by consigners committees.
2. Calves must be consigned by producers only.
3. The committees approve consignments.
4. Beef cattle only make up the sales.
5. Cattle are graded according to quality based on USDA feeder cattle grade standards.
6. Sold in uniform groups by sex, breed, weight, and grade.
7. Calves must meet Ohio health requirements.
8. Committees support a beef cattle improvement program.



Special sales group calves by breed, sex, weight and grade.

HERD HEALTH

In discussing cow-herd health, many diseases and conditions must be considered. Succcssful herd health must be a combination of good management, nutrition, and sanitation.

Prevention of a disease is more practical and economical in the long run than treatment measures after a disease has occurred. Clean sanitation, good management, timely vaccination, attention to detail, and proper nutrition will prevent many troubles.

Know your veterinarian and consult him immediately when trouble is suspected. Early diagnosis and treatment of a disease is likely to be most successful. A dosage syringe properly sterilized and used with disposable needles could be the most useful piece of equipment that a cow man can own. Take every precaution to prevent the spread of disease to your herd.

Breeding diseases are definitely on the increase and must be controlled to have a profitable calf crop. Bulls and cows are all responsible in the spread of venereal disease. Rapid movement by common carriers of cattle over considerable distance has added to the problem of disease control.

Transmittable Diseases: Brucellosis, trichomoniasis, vibriosis and other diseases may be venereally transmitted and cause abortions or lack of conception. Vaginitis is a disease causing inflamation of the vagina, and may disrupt the breeding program of any herd. Some infections may cost an entire calf crop. If venereal diseases are a problem, consider artificial insemination.

Bulls: Have a veterinarian examine the bull or bulls at least six weeks before the start of breeding season. This includes a complete physical examination and tests for brucelosis, tuberculosis, and leptospirosis. Also check for internal and external parasites.

Semen evaluation is recommended because this can eliminate the questionable breeder before part or all of the calf crop is lost or delayed. Bulls that do not pass the semen evaluation check may be held for a retest or sold, depending upon the judgement of the veterinarian.

Sires being purchased should have all of these tests plus a complete herd history. Some breeding diseases such as viruses, mechanical infections and deviations do not have effective tests and the herd history may aid in the detection.

The anatomy of the bull should be considered. Reject animals that have deformities of the skeleton and especially the feet and legs. A bull that cannot travel may not keep up with the herd. Bulls that are too straight in the set of the hocks are more likely to become stifled.

Do not breed a young bull to more than 12 to 15 cows during the breeding season. Young bulls may be used on more cows by hand breeding or by having both spring and fall calves. Overworking young bulls may cause early sterility and reduce the time that they remain in the herd.

Nutrition is closely associated with the general condition of the herd and must be considered as a herd health problem. The pregnant cow with a calf at side is performing several functions simultaneously and should be fed accordingly. She must have sufficient TDN (total digestible nutrients) to maintain her condition, feed a calf, and develop the fetus.

Deficiencies are usually listed as specific ones but most authorities agree that deficiency diseases are usually the result of multiple deficiencies due to the interrelationships between minerals, vitamins and nutrients. When nutritional deficiencies are responsible for unsatisfactory beef cattle production, a lack of energy is the most frequent cause, protein the second, and minerals and vitamins the least.

Vitamins, especially vitamin A, are often considered deficient in the ration. The present recommendation is for 30 thousand units per cow per day. Calcium, phosphorus, and vitamin D probably are incriminated in the vitamin A shortage. High nitrate feed content may add to the complicated situation.

Calving Problems: Calving time is a critical period for a successful operation. This season is the time of year when constant supervision is necessary. In general allow a mature cow two or three hours without progress toward delivery before examination to determine trouble. Allow first calf heifers about one hour longer. Check cows and heifers that are close to calving at least two or three times per day.

In severe weather, closer supervision and dry, clean quarters are necessary. A good supply of available bedding helps prevent trouble in the newborn calf that is born indoors. If possible, allow cows to calve on good clean sod with hills or woods as protection. These calves have less diarrhea and other disease problems.

New Calves: The most serious problems of newborn calves are pneumonia and scours. A good clean area or box stall helps reduce these troubles. Vaccinations, injectable vitamins, and antibiotics may be used soon after birth. These practices are of value but due to the complexity of the diseases may not work every time. Apply iodine to the navel especially on calves born in barns or other contaminated areas.

Colostrum (milk soon after calving) contains antibodies that provide the first defense against disease. It is recommended that newborn calves nurse their mothers as soon after birth as possible. This counteracts the harmful disease producing bacteria, particularly in the digestive tract.

Most disease problems of newborn calves occur during the first two weeks so calves should be checked carefully during this period. Early disease detection gives better results from treatment and calves may be saved that would have died if treated later.

Autogeneous vaccines injected into the cows before calving have been of value in some disease areas. If your program of disease control in newborn calves is effective, stay with it. If not, discuss the use of vaccines, antibiotics, and injectable vitamins with your local veterinarian.

Purchased Herd Replacements: The purchase of new breeding stock can be an unpleaasant experience unless many necessary precautions are taken. All tests should be used. Isolation for 30 days and retesting will reduce your chances of introducing new diseases. Animals purchased from other areas of the country may introduce diseases not commonly appearing in Ohio. If you are in doubt about vaccinations of newly purchased animals, it is good management to re-vaccinate.

Brucellosis in Ohio has been reduced by the cooperative state-federal brucellosis eradication program until the incidence is now low enough for Ohio to qualify as a modified, certified, brucellosis area. Continuous testing is now being handled by the use of back tags at slaughter houses, sale barns, and other markets. This eliminates the on-farm testing that has been necessary in the past unless reactors show up through these tests.

Although this disease is not as economically important as in the past, it is still a constant threat to the cow herds of Ohio until the state can be declared brucellosis free.

The disease affects bred heifers and cows, and bulls may be responsible for spreading the disease. Symptoms of brucellosis are abortions, retained placentas, and weak calves with no systemic sickness.

To control brucellosis, vaccinate all replacement heifers between 90 to 180 days of age and test all breeding stock that is brought into the herd. Recent information shows that by vaccinating heifers at the younger age, the heifers become immune to brucellosis and become blood-test negative much sooner than heifers vaccinated at the older age. Eventually the cooperative state-federal brucellosis eradication program will eliminate the disease and may end the need for vaccination. Use the blood test for diagnosis of the disease.

Leptospirosis is one of the most variable diseases and it cannot be identified by a definite set of symptoms. There are over 60 different members belonging to the leptospira family. Cattle of all ages and both sexes are affected as well as other species of farm animals. Clinical symptoms are variable, but hemoglobinuria and abortions are common. Lepto can be

considered when red urine is present. The final diagnosis is the blood test and can be requested when testing for bangs.

Control should be practical on the farm basis because lepto can be spread to other farm animals. Annual vaccination used in conjunction with a testing program for purchased replacement stock will effectively control the disease. Heifers should be vaccinated when they enter the breeding herd.

Humans can become infected by working with livestock carrying the organisms or by swimming in water contaminated by the urine from infected animals.

Vibriosis is a venereal disease of cattle that may be transmitted by bulls or careless artificial insemination procedures. Its presence results in poor conceptions, long heat periods, and abortions.

Animals under one year of age are apparently not susceptible but after this age there is no age immunity. Vibrio is detected in heifers when they enter the breeding herd because if the disease has been in the herd for some time, the older cows will have developed an immunity. Herd sires are also susceptible. Diseased animals show no clinical symptoms and it is very difficult to recover the organism from a known exposed bull. Classify any bull that has been with an infected herd as an infected animal regardless of recovery of the organism. Diagnosis is based on the recovery of the organism from infected cows, aborted calves, or bulls.

Reports on the use of vaccine in vibrio infected herds have been good. Vaccination is recommended as a satisfactory control measure and should be used when exposure is possible. Infected animals can be effectively treated.

Trichomoniasis is another venereal disease of cattle that causes economic loss primarily due to the low percentage calf crop in infected herds. Its occurrence results in low conception rates, erratic heat periods, and early abortions.

Limited (100 days) breeding seasons aid in the prevention and control because cows usually recover after about three months if not reinfected by the bull. Exercise great precaution in introducing new breeding animals into the herd and in breeding outside cows.

The infected bull is the source of infection and must either be sold for slaughter or treated orally with dimetridazole to clear up.

Shipping Fever Complex is the most common and, in many cases, the most severe disease encountered in adding cattle to the herd. The shipping fever syndrome is thought to be caused by one or more viruses, pasturella (bacteria) and stress.

Due to the complexity of the shipping fever complex, preventive measures are not always effective. Keep close watch on new additions to the herd for three weeks and treat all sick animals at once. Rough handling, long hauls, poor nutrition, weaning, severe weather, and other factors combine to increase the stress on newly purchased animals.

Symptoms are varied but drooping ears, nasal discharge, watery eyes, off feed, coughing, difficult breathing and, in some cases, diarrhea with blood flecks and a general droopy appearance are nearly always present. Control is difficult at best. Along with good management practices, it may be necessary to vaccinate in advance and use antibiotics.

Bovine Virus Diarrhea (BVD) is a highly contagious virus disease of cattle, characterized by increased temperature, diarrhea, nasal discharge, and erosions of the gastrointestinal tract. The disease is complex and may be confused with many other diseases. Cows and heifers that are infected with this disease will have 30 to 50 per cent abortions, but pregnancy is not affected the following year. BVD can be controlled by the use of vaccine.

Infectious Bovine Rhinotracheitis (IBR) is another highly contagious virus infection of cattle primarily affecting the upper respiratory tract, genitalia, conjunctiva, central nervous system, or any combination.

Due to its complexity, this disease is easily confused with shipping fever, BVD, and others. Control is by vaccination.

Anaplasmosis is a disease caused by

microscopic parasites that live in red blood cells. The disease affects mature cattle, but cattle less than two years of age may be carriers without symptoms. It occurs most frequently in warmer areas but has been diagnosed in different herds in Ohio.

Anaplasmosis is spread through actual transfer of blood from cow to cow. Biting inects such as mosquitoes, horse flies and flies are considered the primary source of transfer. It is also spread when dehorning and tattooing instruments, bleeding needles or vaccination needles are used on a carrier animal and then without sterilizing used on a healthy animal. The disease does not spread by contact or through manure or urine of sick animals or carriers.

Control of the anaplasmosis is by testing and slaughter or by testing and treating the reactors. Conduct the testing on a herd basis after the insect season is over. Diseased animals will remain reactors unless treated.

Bovine Enchephalitis (brain disease) is beginning to cause some loss in many feedlots. Death of infected but untreated calves has been over 95 per cent. Although infection rates are generally less than one per cent, it has approached five per cent in some groups. Usually only one or two calves in a single group are involved.

The first indication of an encephalitis problem may be death of one or more calves. A knuckling over of the fetlock joint may be one of the first symptoms. Affected calves are frequently found down and unable to stand up. Calves soon progress to a stupor, followed by paralysis and death—often in less than eight hours.

Treatment of these conditions has been inconclusive. The causative agent is a bacteriaa, so antibiotics may be of some value in treatment. Isolate affected cattle and provide good feed, water, and shelter.

Calf Scours in young calves may either be nutritional or infectious. Use of preventative measures combined with treatment after the scours occur is important.

Newborn calves may scour if they receive too much milk or milk that is too high in butterfat. When this situation occurs, make some changes in the nutrition of the cows. Early calves born while cows are on winter feed are less likely to receive this extra milk which results in digestive upsets and digestive scours. This form of scours is not serious.

White scours are highly infectious scours that may cause heavy death loss in calves within 10 days after birth. Bacteria are associated as a result of unsanitary facilities. If cows must calve in confinement, be sure that facilities are clean and well bedded.

White scours are usually less troublesome when cows calve outside on winter range. Vaccination of the cow four to six week before calving has shown some promise for control. It is important that the calves receive the colostrum from their dams and early treatment of the navel cord with iodine are recommended preventive measures.

Symptoms of this disease are distress, sunken eyes, loss of appetite, rough hair coat, and severe diarrhea with light colored, foul smelling, watery or foamy feces. Scours is seldom the direct cause of death but the continued diarrhea lowers the vitality and resistance to such an extent that other diseases, paricularly pneumonia, develop as secondary infections and may cause death.

Antibiotics are of value in treating calf scours and vaccine may be used as a prevention.

Coccidiosis is primarily a disease of young cattle that are grouped together in close confinement although occasionally it may occur in beef cow herds. Diagnosis is based on straining, bloody discharge in the feces, and identifying the oocyst in the manure. Young animals may become anemic and weak.

Feedlots are ideal for the development of this one-celled organism which is picked up through the feed and water. The organism invades the lower bowel and may cause severe bleeding. Antibiotics have given effective control of this disease.

Pink Eye affects cattle of all ages and

breeds and is more prevalent when cattle are on pasture during the summer. Usually the first symptom is increased watering of the eye. The eyelid may become swollen and be held partially closed in an effort to protect the sensitive inflamed eye and membranes from light, wind, dust, and flies. Discomfort and lessened feed intake may cause loss of weight. Later the eye has a milky appearance. The cornea and conjunctiva are the affected areas and advanced cases may result in a ruptured cornea.

Infections may be spread by flies and especially face flies which are attracted by the water secretion.

Increased resistance can be obtained by vaccination as well as the injection or feeding of vitamin A. Pinkeye ointment or sprays seem to be effective if applied in the early stages.

Cancer Eye is a condition of older cattle and is easily recognized. It starts with small growths appearing on the eyeball or surrounding tissue and in time may affect the entire area. Affected animals in commercial herds should be sent to slaughter.

Foot Rot is ordinarily indicated by lameness either with or without swelling in the hoof region or between the toes. A foul odor will develop. In some cases no external break in the skin is seen, but swelling of the leg just above the hoof is obvious. Bacteria and fungi that are associated with dampness are responsible for infections.

Various drugs claim prevention of foot rot and should be used in severe outbreaks. Organic iodides added to the salt is a good control measure. Concrete slabs around drinking and eating areas along with good drainage aid in the control of this disease. A foot bath of copper sulfate and water will help; however, it is necessary to see that all cattle walk through it twice daily. The use of antibiotics in the early stages can be very effective.

Blackleg and Malignant Edema are acute infectious diseases that mainly affect young cattle; however, they have occurred in older non-vaccinated cattle. Young cattle from 6 to 24 months of age are most susceptible.

First symptoms of these diseases may be lameness or sudden death. Control is the use of vaccination of calves. If calves have been vaccinated at an early age, revaccinate at the age of six months.

Bloat is caused by an accumulation of gas or froth in the rumen faster than it is eliminated. It is recognized by an expanding or swelling on the left side of the animal in the hollow just in front of the hip. All ages of cattle may be affected and it may be classified according to the severity into the chronic or acute types. Severe bloat may cause death by filling the rumen until it crowds the lungs and causes death by suffocation.

Bloating generally is more serious when beef cattle are grazing succulent, tender, rapid-growing legume pasture when conditions are favorable for rapid growth. Plants chiefly causing bloat are the legumes—ladino clover, alsike clover, alfalfa, red clover, and white clover, in about that order. Include enough grass in the meadow mixtures to insure over half grass.

Control is to feed hay before allowing animals to graze new pasture containing legumes. Allow plenty of water at all times and avoid rapid feed changes. Bloat blocks or mixtures are available but the results are variable. These blocks or mixtures usually contain antibiotics or silicones as the preventative ingredients.

A new compound, poloxalene, has recently been released that shows considerable promise for use with legumes, either pasture or hay. Follow all directions carefully. To be effective, it is necessary that each animal receive a specified amount of the compound daily.

Grass Tetany is accompanied by low magnesium levels in the blood serum. The deficiency most commonly occurs in cows when they are first turned on pasture in the spring but may occur while still being fed hay during late winter and spring. Tetany is becoming more widespread and serious in the eastern and southeastern counties of Ohio.

Early symptoms are characterized by a

dull appearance and loss of appetite in cows. They often walk stiff with very little flexibility in their hind legs, giving the impression that the animals are staggering. During the latter stages, animals may be found leaning against fences or feeders and when down may try to rise and fall back.

If tetany is a problem each year it may be desirable to add a 10 per cent level of magnesium oxide to trace mineralized salt and feed throughout the year.

Internal Parasites—It is a mistake to assume that feeder calves do not have internal parasites. Late summer calves tend to be more susceptible to retarded growth caused by worms.

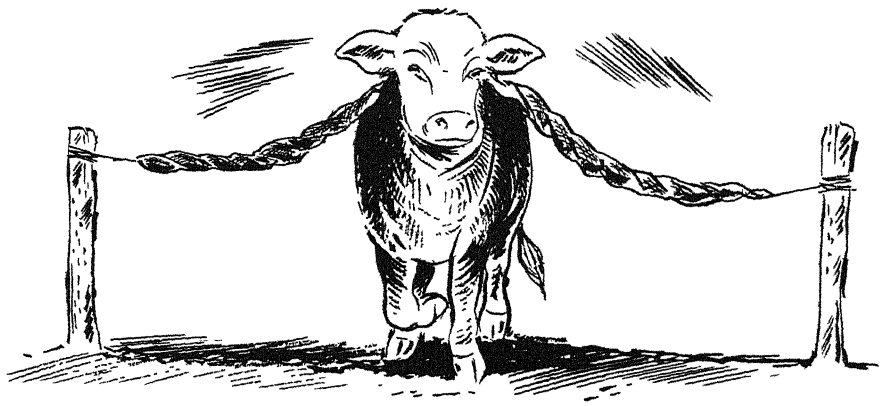
Worm eggs are passed in the manure and are picked up while grazing. Infestation is heavier while cattle are grazing short pasture. Young calves getting limited amounts of milk are less likely to overcome the effects of worm development in the digestive tract.

A very good time to check feeder cattle is at weaning time and the cow herds may also be checked at this time. The degree of infestation is determined by the egg count in a fecal sample. If internal parasites are present in sufficient numbers, worming is indicated and will pay dividends.

Copper sulphate dissolved in water may be used for stomach worms while nicotine sulphate is effective against tapeworms as well as stomach worms. Phenothiazine or thiabendazole may be used effectively. Treatment to prevent reinfestation consists of treating animals both in the spring and fall. Caution: Do not apply sprays at the same time cattle are given oral medications such as phenothiazine.

External Parasites—Cattle lice are widely distributed throughout Ohio and may become a major problem during certain seasons of the year. Cattle are usually infested throughout the year. However, louse build-ups usually increase during colder weather when the hair coats thicken and animals are confined closer together. November is the time to take the necessary measures for louse problems.

Treating all animals is necessary for control of external parasites. *The type of control measure is not important,* but control is. When louse carriers (animals with extremely heavy infestations) show up in the herd, it may be desirable to



Control horn flies with back rubbers.

send these animals to slaughter.

Improper or lack of control of lice will cause great economic loss due to poor condition or even death of animals in some cases. Loss of hair, dark, dirty appearance of white areas, rubbing, and licking are all symptoms.

Cattle lice can be controlled through the use of sprays, dips, dusts, or rubbing devices. The important thing is to use the proper concentration of the insecticide as recommended by the manufacturer.

Horn Flies are primarily pests of cattle and are present from spring until fall. They sometimes decrease in numbers during hot, dry weather. They usually attack the backs of cattle, out of reach of the tail and the swing of the head.

The use of insecticides in back rubbers will effectively control horn flies. Follow the recommendations of the manufacturer.

Face Flies spend most of their time on the faces of cattle and may cause a greater economic loss than horn flies. Face flies are instrumental in increasing the incidence of pinkeye within a herd.

Some control can be obtained by the use of Coral solution on a burlap flap hanging on the front of the mineral or salt box. When the animal uses the salt box, the face comes in contact with the treated flap.

Cattle Grubs—These larvae are the result of eggs laid on the animals by heel flies. You can tell if cattle are attacked by heel flies because in late spring they will run with their tails lifted high. The eggs are laid on the legs of cattle at this time of year. When eggs hatch, the larvae enter the animal through the skin in the twist and leg areas. The larvae move through the tissue and finally are deposited along the back area of the animals.

Grub losses are heavy due to the slower rate of gain, the damage to the hide, and the necessary extra trim of the carcass. Make an effort to control grubs.

Rotenone, as a dust or spray, may be used to treat grubs after they appear in the backs. Squeezing out the grubs is not recommended because they will die and be absorbed.

Systemic insecticides give excellent control of grubs in beef cattle. The insecticides are called systemics because they are distributed inside the body of the animal. The circulatory system carries the insecticide to the site where the grubs occur. Proper timing of systemic insecticide application is important. Only one application is necessary, but it should be made as soon as possible after all heel fly activity has stopped. Early applications are safer and more effective than later ones. Treatment in Ohio should be made no later than early October on Ohio produced cattle.

Caution: Follow manufacturer's recommendations closely. Do not apply a systemic insecticide to an animal that is stressed, weak, or sick. Do not overdose. Do not use more than one systemic insecticide. Do not apply in conjunction with oral drenches or other internal medications such as phenothiazine.

FACILITIES

Providing and using expensive barns and housing for a beef cow herd usually results in higher costs per cow without increasing production. When cows are confined in a barn, the chances of disease spreading in a herd is increased.

Allow beef cows to be outside all of the time during the grazing period and most other times—even in winter. Beef cattle naturally grow long thick hair coats in the fall and the most shelter they need under Ohio conditions is a wood lot or a hill for a windbreak. Many successful Ohio beef cowmen do not house their cows in the winter.

If a shed or barn is used, have it open to the south or east (to gain wind advantage) with an adjoining lot to permit cattle indoors or outdoors at their choosing. Inexpensive pole barns made from rough lumber sawed off the farm is adequate. Remodelled horse barns with one

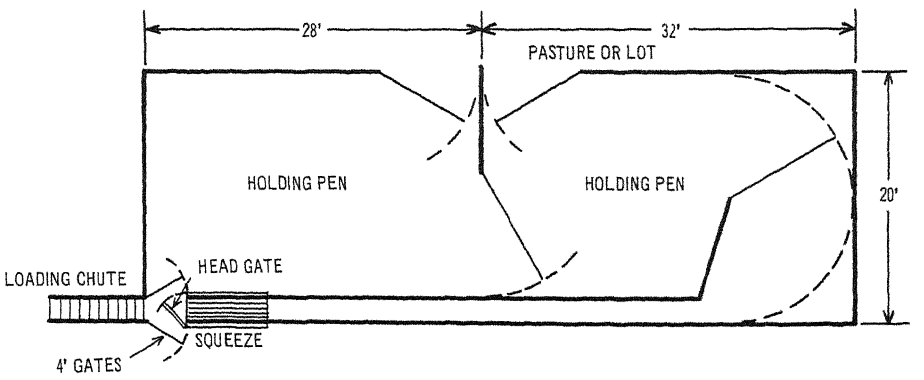
side removed and outside lots will serve the purpose Give more attention to housing feed and saving labor in feeding and manure handling than the necessity of getting the cows inside A combination of drafts, dampness, poor ventilation, and lack of sunlight create hazards

Fencing need not involve excessive expense For holding cattle, four barbed wires are sufficient, and in many localities cowmen construct satisfactory fences of three wires only. Four wires should be used along much traveled roads and the three wire fences are sufficient for other areas It should be kept in mind that the life of the fence depends to a great extent on the life of the posts and the stability of the corner posts

The latest innovation is the use of electric fence which can be constructed at only a fraction of the cost of regular barbed wire fence, and should be used for temporary fencing of meadows (for grazing regrowth) and for cross fencing for rotation grazing Once cattle become accustomed to the hot wire they will not challenge it further.

An essential part of a beef cow or feeder operation is a well planned, workable corral system for routine and special handling of the cattle Corrals should be located where they are accessible and, if practical should contain a water supply A workable set of corrals need not be elaborate and can be constructed from home sawed lumber and locust posts. A loading chute and a two-foot wide working chute should be included in the facility For specific plans, consult Midwestern Beef Equipment Plans (MWPS-6) which is available from your county agricultural agent

Lack of adequate facilities for handling beef cattle prevents many producers from carrying out many practices which would otherwise be routine and would increase their returns from the beef cattle operation Time and money spent in planning and developing handling facilities for cattle will return dividends in terms of added profits and greater efficiency



A simple corral with minimum facilities for handling animals.